WHAT IS CLAIMED IS:

1. A work vehicle comprising:

a frame;

an axle assembly coupled to the frame and including a first axle shaft and a first axle housing, wherein the first axle shaft is disposed substantially within the first axle housing;

a first wheel coupled to the axle assembly;

an axle lubricating fluid disposed within the first axle housing; and

a first axle cooling device disposed within the first axle housing, in contact with at least a portion of the lubricating fluid, including a first coil.

2. The work vehicle of claim 1, further comprising a cooling fluid contained within the first coil, wherein the first coil is configured to conduct cooling fluid therethrough and to maintain the cooling fluid separate from the lubricating fluid.

3. The work vehicle of claim 2, further comprising a cooling fluid circuit fluidly coupled to the first coil, wherein the cooling circuit includes a cooling fluid pump and a cooling fluid reservoir, and wherein the first coil receives cooling fluid from the pump and delivers cooling fluid to the reservoir.

4. The work vehicle of claim 3, further comprising a heat exchanger disposed in the cooling circuit between the first coil and the reservoir to remove heat from the cooling fluid.

5. The work vehicle of claim 4, further comprising a control valve disposed to direct at least a portion of the cooling fluid to the first coil at a predetermined pressure difference across the first coil.

6. The work vehicle of claim 3, further comprising a second wheel, wherein the axle assembly is further coupled to the second wheel and further

includes a second axle shaft, a second axle housing, and a second coil, and further wherein the second axle shaft and the second coil are disposed substantially within the second axle housing.

7. The work vehicle of claim 6, wherein an inlet of the second coil is in fluid communication with an inlet of the first coil and an outlet of the second coil is in fluid communication with an outlet of the first coil, and parallel flow paths are thereby provided through the first and second coils.

8. The work vehicle of claim 6, wherein:

the cooling circuit further includes a crossover conduit;

an inlet of the first coil receives cooling fluid from the pump;

an outlet of the first coil delivers cooling fluid through the crossover conduit to an inlet of the second coil; and

an outlet of the second coil delivers cooling fluid to the reservoir,

the second coil being thereby coupled to the first coil in series flow relationship by the crossover conduit.

9. An axle assembly for a work vehicle, the axle assembly comprising:

a first axle shaft and a first axle housing, wherein the first axle shaft is disposed substantially within the first axle housing;

a second axle shaft and a second axle housing, wherein the second axle shaft is disposed within the second axle housing, and wherein the second axle shaft and the second axle housing are disposed coaxial with, and in opposing relationship to, the first axle shaft and the first axle housing, respectively;

a first cooling device disposed within the first axle housing;

a second cooling device disposed within the second axle housing;

a differential gearset housing positioned intermediate the first and second axle housings and defining a chamber configured therein to receive a differential gearset;

a differential gearset disposed within the chamber and rotatively coupled to the first and second axle shafts;

a lubricating fluid disposed within the first and second axle housings; and

a first axle cooling device disposed within the first axle housing, and a second axle cooling device disposed within the second axle housing.

10. The axle assembly of claim 9, further comprising a cooling fluid housed within the first and second axle cooling devices, wherein the first and second axle cooling devices are configured to conduct cooling fluid therethrough and to maintain the cooling fluid separate from the lubricating fluid.

11. The axle assembly of claim 10, wherein the first and second cooling devices include first and second coils, respectively, each coil configured to provide at least two passes of the cooling fluid through the lubricating fluid within each of the first and second axle housings.

12. The axle assembly of claim 11, wherein the work vehicle further includes a cooling fluid circuit for causing cooling fluid to flow through the first and second coils.

13. The axle assembly of claim 12, wherein the cooling circuit includes a cooling fluid pump and a cooling fluid reservoir and the first and second coils receive cooling fluid flowing from the pump and deliver it to the reservoir.

14. The axle assembly of claim 13, wherein the cooling circuit further includes a heat exchanger in fluid communication with the first and second coils.

15. The axle assembly of claim 13, wherein the cooling circuit further includes a control valve for directing at least a portion of the cooling fluid flow to the first and second coils at a predetermined pressure difference across the first and second coils.

16. The axle assembly of claim 15, wherein the control valve is configured as a back pressure regulating valve.

17. The axle assembly of claim 12, further comprising a crossover conduit for coupling an outlet of the first coil to an inlet of the second coil.

18. A method of cooling an axle assembly of a work vehicle, wherein the axle assembly includes an axle shaft, an axle housing configured to substantially surround the axle shaft, a cooling coil housed within the axle housing and having a passage therethrough and outer and inner surfaces, a lubricating fluid disposed within the axle housing, and a cooling fluid disposed within the passage, and further wherein the lubricating fluid is of a higher temperature than is the outer surface of the coil and the outer surface of the coil is of a higher temperature than is the cooling fluid, the method comprising steps of:

removing heat from the lubricating fluid by placing the lubricating fluid in contact with the outer surface of the coil; and

removing the heat from the inner surface of the coil by circulating the cooling fluid through the passage.

19. The method of claim 18, further comprising the step of:

directing flow of cooling fluid to the coil by using a back pressure regulating valve to impose a pressure difference across the coil.

20. The method of claim 19, further comprising the step of:

removing the heat from the cooling fluid by circulating the cooling fluid through a heat exchanger.